DEVICE FOR LUBRICATION AND/OR STORAGE OF AN INFLATION NEEDLE

Field of invention

The present invention relates to (a) inflation of inflatable articles such as inflatable footballs, soccer balls and the like which are inflated by insertion of an inflation needle through a valve of the aforementioned inflatable articles, and (b) storage of inflation needles.

Background of the invention

Regarding (a), inflatable articles such as inflatable footballs, soccer balls and the like are typically inflated via a valve which is designed to prevent the escape of gas from within the inflatable article both while the inflatable article is being inflated and after inflation. The valve therefore has to seal against an external cylindrical surface of an inflation needle which has been inserted therethrough for the purpose of inflating the inflatable article. The valves of inflatable articles are typically formed of a rubber like compound and because they are required to seal against an external cylindrical surface of an inflation needle during inflation of the inflatable article it is typically difficult to insert an inflation needle into an inflatable article.

British patent specification GB2138015A addresses the problem regarding the difficulty of insertion of an inflation needle into an inflatable article by the provision of an alternative valve. The alternative valve is designed to self lubricate a passage through which an inflation needle is inserted upon withdrawal of the inflation needle from the passage. The self-lubrication makes it easier for subsequent insertion of an inflation needle.

US patent 4043356 has addressed the problem of insertion of an inflation needle into an inflatable article by providing an alternative inflation needle. The alternative inflation needle is made from a material which includes a lubricant to assist entry of the inflation needle into an inflatable article.

In order to address the problem of insertion of an inflation needle into an inflatable article it is therefore necessary to either use an inflatable article which includes the alternative valve of GB2138015A or use the alternative inflation needle of US4043356. It is therefore desirable to address the problem of insertion of an inflation needle into an inflation article without reliance upon an inflation needle or valve which has been specifically designed to make passage of an inflation needle through an inflation valve easier.

Regarding (b), inflation needles can be vulnerable to damage or breakage either when attached to a pump or when removed from the pump and stored in a location and/or manner in which they may be damaged or broken. Furthermore, inflation needles are typically sold in a disposable package which is formed of cardboard and plastic and are sometimes sold in pairs. If the disposable package is broken for removal of one of the pair of inflation needles, the remaining inflation needle can be easily lost and/or damaged.

It is therefore desirable to provide an inflation needle storage device which is suitable for storing one or more inflation needles in a manner which at least partially addresses one or more of the above problems regarding inflation needle storage.

Summary of the invention

In a first aspect the present invention provides a container adapted for lubricating an external longitudinal surface of an inflation needle which is suitable for inflating articles having a resiliently flexible, substantially gas tight valve, said container comprising an opening for passage therethrough of at least a portion of the longitudinal length of said inflation needle, in a direction substantially aligned with a longitudinal axis of said inflation needle, and closure means for at least partially preventing passage of a liquid or solid lubricant through said opening, the closure means being movable from a closed position which at least partially prevents passage of liquid or solid lubricant through the opening, to an open position to allow insertion of at least a portion of said inflation needle into said container via said opening, wherein, in said open position, said closure means is

arranged to substantially allow equilibration of gas pressure within the container with the gas pressure external of the container and at least partially prevent passage of liquid or solid lubricant through said opening, while at least a portion of said inflation needle is inserted through said opening.

Suitably, said container is in the shape of an inflatable article, such as an inflatable football or soccer ball.

Suitably, said opening comprises a mouth of said container.

Suitably, said closure means comprises a sealing member having a resiliently flexible portion which is moveable between said closed and open positions.

Suitably, said resiliently flexible portion is arranged to at least partially seal against another portion of said sealing member, when in said closed position, to at least partially prevent passage of liquid or solid lubricant through said opening.

Alternatively, said resiliently flexible portion may be arranged to at least partially seal against a portion of said container, when in said closed position.

Alternatively, said closure means comprises a cover which is arranged to attach to said mouth of said container, a portion of said cover being arranged to move from said open position to said closed position to at least partially sealingly engage said container to at least partially prevent passage of liquid or solid lubricant through said opening.

Alternatively, said cover comprises a lid having a resiliently flexible portion which is arranged to move from said open position to said closed position to at least partially sealingly engage another portion of said lid and/or said mouth to at least partially prevent passage of liquid or solid lubricant through said opening.

Suitably, said closure means comprises a valve.

Suitably, said valve is attached to said mouth of said container.

Suitably, said valve is at least partially removably attached to said mouth of said container.

Suitably, said valve includes a groove formed between two outwardly projecting flanges, said outwardly projecting flanges being arranged to abut outer and inner surfaces of a wall of said container, adjacent said mouth of said container.

Suitably, said valve further comprises a resiliently flexible flap which is arranged to move to said open position upon application of a predetermined force to provide an opening in said valve for passage therethrough of at least a portion of said inflation needle.

Suitably, said resiliently flexible flap is arranged to extend inwardly of the container when in said open position.

Suitably, said resiliently flexible flap is arranged to move to said closed position and at least partially sealing engage a portion of said valve upon withdrawal of said inflation needle from said container.

Suitably, said resiliently flexible flap comprises a rubber sheet.

Suitably, said valve includes a grommet formed of resiliently flexible material which may include rubber or a rubber like compound.

Suitably, said container is at least partially filled with a liquid and/or solid lubricant.

Suitably, said container is at least partially filled with lubricant absorbent material which is arranged to absorb and therefore disperse a liquid lubricant throughout at least part of an internal volume of said container.

The liquid absorbent material is preferably arranged to fill greater than 50% of the internal volume of said container.

Suitably, said lubricant absorbent material includes wadding.

Alternatively, said container includes particles which are arranged to fill at least a portion of said internal volume of said container and disperse liquid and/or solid lubricant throughout at least a portion of said internal volume of said container.

Suitably, said particles are arranged to fill approximately 75% of said internal volume of said container.

Alternatively, said container is at least partially filled with lubricating particles at least partially comprising a solid lubricant.

The lubricating particles may be sized to prevent passage through said opening of said container when said closure means is in said open position.

The container may include opening means for opening of the container to enable capturing of said lubricating particles within said container.

In a second aspect the present invention provides a container adapted for lubricating an external longitudinal surface of an inflation needle which is suitable for inflating articles having a resiliently flexible substantially gas tight valve, said container comprising an opening for passage therethrough at least a portion of the longitudinal length of said inflation needle, in a direction substantially aligned with a longitudinal axis of said inflation needle, said container being arranged to contain a plurality of lubricating particles formed at least partially of a solid lubricant wherein said particles and a mouth of the container which forms said opening are sized to prevent passage of said particles through said opening.

Suitably, said solid lubricant is comprised in an external surface of said lubricating particles.

Suitably, said solid lubricant at least partially comprises silicone.

Suitably, said lubricating particles comprise silicone beads.

Suitably, up to approximately 75% of said internal volume of said container is filled with silicone beads.

Suitably, said silicone beads are substantially spherical.

Suitably, said lubricating particles are resiliently flexible to facilitate passage of said lubricating particles through said opening upon resilient deformation of said lubricating particles.

Alternatively, said container includes opening means for opening the container to enable capturing of said lubricating particles within said container.

Suitably, said opening means comprises a larger closeable opening which is closeable via closing means, said opening being arranged for passage therethrough of said lubricating particles upon movement of said closing means to an open position.

Alternatively, said opening means may comprise a hinge.

In a third aspect the present invention provides a resiliently flexible lubricating particle formed at least partially of a solid lubricant, the resiliently flexible lubricating particle being arranged for passage through said opening of said container of the first and second aspects of the present invention, upon application of a sufficient predetermined force to sufficiently deform said lubricating particles.

In a fourth aspect the present invention provides an inflation needle storage device comprising a body forming a passage which extends at least partly through the body, the passage being arranged for receipt of an inflation needle which is suitable for inflating articles having a resiliently flexible, substantially gas tight valve, the passage being arranged to receive the inflation needle so that a longitudinal axis of the inflation needle, when appropriately received within the passage, is substantially aligned with a longitudinal axis of the passage, the body including resiliently flexible retaining means which is arranged to form at least a portion of the passage, the resiliently flexible retaining means being arranged to resiliently deform upon insertion of the inflation needle into the passage so that it applies a predetermined force to an external surface of an inflation needle when it is inserted into the passage to result in the inflation needle being retained within the passage until predetermined forces are applied to the inflation needle and body to remove the inflation needle from said passage.

Suitably, said passage extends through said body.

Suitably, said passage is substantially circular in cross-section.

Suitably, said resiliently flexible retaining means comprises said body, said body being solid except for said passage and formed of resiliently flexible material such as high density foam rubber.

Suitably, said body is cylindrical in shape.

Suitably, a longitudinal axis of said passage is substantially aligned with a longitudinal axis of said body.

Suitably, said passage has a diameter which when undeformed is larger than a diameter of a portion of said inflation needle which is designed for passage through a resiliently flexible, substantially gas tight valve of a container which is designed for inflation with said inflation needle and smaller than an enlarged end of said inflation needle which is arranged for threadable connection to a pump.

Suitably, said body includes a plurality of said passages.

Suitably, said body comprises another passage, the other passage being larger in diameter than said passage and being arranged for passage of a flexible elongated member therethrough, said body being arranged to hang from a lower end of said flexible elongated member upon supporting of said flexible elongated member.

In a fifth aspect the present invention provides an inflation needle storage device comprising a body having clamping means for clapping an inflation needle which is suitable for inflating containers having a resiliently flexible, gas tight valve, relative to said body, said clamping means extending from said body and being arranged to move between a closed position in which an inflation needle is clamped between the clamping means and a portion of said body and an open position in which the inflation needle can be removed from said storage device, said clamping means being arranged to clamp an inflation needle around an enlarged region of said inflation needle which is proximal an end of said inflation needle which is arranged for threadable connection to a pump.

Suitably, said body of said inflation needle storage device of the fifth aspect of the present invention and said clamping means comprise corresponding indentations which are arranged to at least partially enclose said enlarged section of an inflation when said clamping means is in said closed position so that substantially movement of an inflation is prevented in a direction which is substantially aligned with a longitudinal axis of said inflation needle.

Suitably, said inflation needle storage device of the fifth aspect of the present invention further comprises detent means which is arranged to detain the clamping means in said closed position.

Suitably, said clamping means comprises an arm which is pivotable relative to the body.

Suitably, said inflation needle storage devices of the fourth and fifth aspects of the present invention may each be suitable for use with the container of the first or second aspects of the present invention.

The inflation needle storage device of the fourth and fifth aspects of the present invention, and the container of the first and second aspects of the present invention, may each include corresponding attachment means for attachment of the inflation needle storage devices of the fourth or fifth aspects of the present invention and the container of the first or second aspects of the present invention together.

In a sixth aspect, the present invention provides a method of storing an inflation needle which is suitable for inflating containers having a resiliently flexible, substantially gas tight valve, the method comprising the step of:

inserting said inflation needle into a passage formed in a resiliently flexible body so that a longitudinal axis of said inflation needle substantially coincides with a longitudinal axis of said passage and said resiliently flexible body is at least partially resiliently deformed by the presence of an enlarged end of said inflation needle which, in use, is arranged for threadable connection to a pump, within said passage.

In the preceding summary of the invention and the claims which follow, except where the context requires otherwise, due to express language or necessary implication, the words "comprising", "comprises" or "comprise" are used in the sense of "including"; that is, the features specified may be associated with further features in various embodiments of the invention.

Brief description of the drawings

A preferred embodiment of the present invention will now be described, by way of example only, with reference to the following drawings in which:

Figure 1 is a perspective view of one example of an inflation needle lubricating container of the present invention formed in the shape of a football;

Figure 2 is a side elevational view of the football shaped inflation needle lubricating container of Figure 1;

Figure 3 is a plan view of the container of Figure 1;

Figure 4 is a longitudinal sectional view of the container of Figure 1 along line a-a of Figure 1.

Figure 5 is a plan view of a rubber grommet of the container of Figure 1;

Figure 6 is a side elevational view of the rubber grommet of Figure 5;

Figure 7 is a sectional view of the rubber grommet of Figure 5 through line b-b of Figure 5;

Figure 8 is a longitudinal sectional view similar to that of Figure 4 which includes a longitudinal sectional view of one example of a pump and associated inflation needle with the inflation needle positioned external of the container and near the rubber grommet;

Figure 9 is a longitudinal sectional view of the container, and associated pump and inflation needle of Figure 8 with the inflation needle inserted through the rubber grommet and into the container;

Figure 10 is a perspective view of one example of an inflation needle storage device;

Figure 11 is a longitudinal sectional view through line A-A of Figure 10;

Figure 12 is a plan view of the device of Figure 10;

Figure 13 is a perspective view of the device of Figure 10 with a cord inserted through a central bore of the device of Figure 10 which extends entirely through the inflation needle storage device of Figure 10.

Figure 14 is a perspective view of the inflation needle storage device similar to that of Figure 13 with four inflation needles inserted into four outer bores of the inflation needle storage device of Figure 13.

Best mode of carrying out the invention

Referring to Figures 1-6, the inflation needle lubricating container 10 generally comprises a football shaped container 12 having an opening 14 and an attachment lug 16. The inflation needle lubricating container 10 also includes a cord 18 which is attached to the inflation needle lubricating container 10 via engagement of a clip 19 which is attached to the cord 18, and the lug 16. The cord 18 can, for example, be worn around a neck of a user and can also be used to enable the inflation needle lubricating container 10 to be hung up in a convenient location near a pump and associated inflation needle.

The football shaped container is hollow and, referring to Figure 8 is filled with wadding 20. The wadding 20 is designed to generally fill the internal volume of the container 12. After the container 12 has been generally filled with wadding 20, a liquid lubricant (not shown) is poured into the container 12, through the opening 14. The liquid lubricant which is poured into the container 12 is absorbed by the wadding 20. The wadding therefore ensures that the liquid lubricant is dispersed throughout the container 12.

Referring to Figures 1-8, the container is orientated so that its longitudinal axis extends upwardly. The opening 14 is positioned near an upper end of the container 12. Referring to Figure 4, the opening 14 is formed by a mouth 22 of the

container 12. A rubber grommet 24 (see Figure 5-7) is attached to the mouth 22 of the container 12.

The rubber grommet 24 is a generally donut shaped rubber grommet. It includes a groove 26 having a square shaped cross section which is formed in an outer annular surface of the rubber grommet 24. The groove 26 is designed to receive an edge 28 of the mouth 22 of the container 12.

A central cylindrical blind passage 30 of the generally donut shaped rubber grommet 24 is prevented from extending through the rubber grommet 24 by a circular rubber sheet 32 which extends from an inner cylindrical surface 34 of the rubber grommet 24. The circular rubber sheet 32 is attached to the inner cylindrical surface 34 so that it extends across one end of the cylindrical blind passage 30. The circular rubber sheet 32 is attached to less than two thirds of the circumferential length around the inner cylindrical surface 34. An unattached region 42 (see Figure 5) is therefore free to resiliently flex to provide a passage 35 through the rubber grommet 24.

The rubber grommet 24 is attached, via the groove 26 to the mouth 22 of a container 12 so that the circular rubber sheet 32 is positioned inside a wall 43 of the container 12. Referring to Figure 9, by inserting an inflation needle 36 of a pump 38 into the cylindrical blind passage 30, an end 40 of the inflation needle 36 forces the unattached region 42 (see Figure 5) of the circular rubber sheet 32 into the container 12 to provide the passage 35 for passage therethrough of the inflation needle 36. In passing through the rubber grommet 24 the inflation needle 36 passes into the wadding 20. This results in an outer cylindrical surface of the inflation needle 36 being coated with lubricant.

Withdrawal of the inflation needle 36 from the container 12 results in the unattached region 42 of the rubber grommet 24 resuming its initial position where it seals against the inner cylindrical surface 34 of the rubber grommet 24 (see Figures 7 and 8). After withdrawal of the inflation needle 36 from the container 12 it is lubricated and ready for insertion through a valve of an inflatable article. When the unattached region 42 of the circular rubber sheet 32 is in the closed position of

Figures 7 and 8 it generally seals against the inner cylindrical wall 34 of the rubber grommet 24 to prevent the passage of lubricant through the opening 14 of the container 12.

Referring to Figures 10-14, one example of an inflation needle storage device 43 comprises a cylindrical object 44 which is formed of high density foam rubber and having five bores 46, 48, 50, 52 and 54 which have longitudinal axes that are approximately aligned with a longitudinal axis of the cylindrical object 44. The bores 46-54 extend from an upper end of the cylindrical object 44, entirely through the longitudinal length of the cylindrical object 44 to a lower end. The bores 46-54 therefore exit either ends of the cylindrical object 44 via the upper and lower end surfaces 56 and 58 respectively of the cylindrical object 44.

The bore 46 is a central bore which is positioned within the cylindrical object 44 so that its longitudinal axis approximately coincides with a longitudinal axis of the cylindrical object 44. The bores 48-54 are positioned around the central bore 46 so that the axis of each of the bores 46-54 are substantially aligned and so that each of the bores 48-54 are approximately the same distance from the central bore 46. The bores 48-54 are positioned slightly closer to an outer cylindrical surface of the cylindrical object 44, than the central bore 46.

Referring to Figure 9, the diameters of the bores 48-54 are greater than the diameter of the end 40 (see Figure 9) of the inflation needle 36 and less than the diameter of an enlarged end 60 (which is designed to threadably engage the pump 38) of the inflation needle 36. An inflation needle 36 can be stored in one of the bores 48-54 of the cylindrical object 44 by inserting the end 40 of the inflation needle 36 of Figure 9 into an upper end of one of the bores 48-54. By inserting the end 40 of the inflation needle downwardly, along the longitudinal length of one of the bores 48-54, the enlarged end 60 of the inflation needle 36 abuts the upper end surface 56 of the cylindrical object 44. By applying downward pressure to the upper enlarged end 60 of the inflation needle 36, an upper end of one of the bores 48-54 is resiliently deformed and enlarged. Such deformation of the bore into which the inflation needle 36 is inserted results in the high density foam rubber

material of the cylindrical object 44 contracting around the upper enlarged end 60 of the inflation needle 36 to grip the inflation needle 36 and hold it firmly within the cylindrical object 44.

The diameter of the central bore 46 is greater than the diameter of the bores 48-54 and is designed to enable passage therethrough of the cord 18 of Figure 1. By inserting the cord 18 through the central bore 46 of the cylindrical object 44, the cylindrical object 44 can be slid along the length of the cord 18 until it contacts the clip 19 (see Figure 1) which extends from the cord 18. The cylindrical object 44 is therefore positioned near the clip 19 and football shaped container 12 so that when the cord 18 is positioned around a person's neck, the inflation needle storage device 42 and inflation needle lubricating device 10 hang downwardly.

An object such as a piece of wire having a hook extending from one end which is suitably dimensioned for passage through the central bore 46 may be useful for drawing the cord 18 through the central bore 46.

It will be understood that the invention disclosed and defined in this specification extends to all alternative combinations of two or more of the individual features mentioned or evident from the text and/or drawings. All of these different combinations constitute various alternative aspects of the invention. Various changes and modifications may be made to the embodiments described and illustrated without departing from the present invention.